

FORM PTO-1390

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE  
TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER:  
794K US 3839

U.S. APPL. NO. (if known - see 37 CFR 1.5)

10/018883

INTERNATIONAL APPLICATION NO.:  
PCT/FR00/01772

INTERNATIONAL FILING DATE:  
23 JUNE 2000

PRIORITY DATE CLAIMED:  
25 JUNE 1999

TITLE OF INVENTION: SUPPLY DEVICE FOR SNOW GUN

APPLICANT(S) FOR DO/EO/US: Jean-François DION and Pierrick JOUNEAU

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
  2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
  3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
  4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
  5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
    - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
    - b. ☐ has been transmitted by the International Bureau. (see attached copy of PCT/IB/308)
    - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
  6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
  7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
    - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
    - b. ☐ have been transmitted by the International Bureau.
    - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
    - d. ☐ have not been made and will not be made.
  8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
  9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
  10. ☐ A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
- Item 11. to 16. below concern document(s) or information included:
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
  12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
  13. ☐ A **FIRST** preliminary amendment.
  14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
  15. ☐ A substitute specification.
  16. ☒ A change of power of attorney and/or address letter.
  16. ☒ Other items or information:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT/IPEA/409), INTERNATIONAL PUBLICATION, INTERNATIONAL SEARCH REPORT (PCT/ISA/210), ABSTRACT on a separate sheet, APPLICATION DATA SHEET

U.S. APPLICATION NO. (if known, see 37 CFR 1.53)

10/018883

INTERNATIONAL APPLICATION NO.  
PCT/FR00/01772ATTORNEY'S DOCKET NO.  
794K US 383917. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):**

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$ 1,040.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$ 890.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$ 740.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$ 710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$ 100.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$ 890.00

Surcharge of \$130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

\$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$
Total claims	9 - 20 =	0	X \$18.00	\$
Independent claims	1 - 3 =	0	X \$84.00	\$
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ \$280.00	\$

**TOTAL OF ABOVE CALCULATIONS =**

\$ 1,020.00

Reduction of 1/2, if applicant is entitled to Small Entity status under 37 CFR 1.27.

+

\$

**SUBTOTAL =**

\$ 1,020.00

Processing fee of \$130 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$ 1,020.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+

\$

**TOTAL FEES ENCLOSED =**

\$ 1,020.00

Amount to be  
refunded:

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a. ☒ A check in the amount of \$ 1,020.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ to cover the above fees. A duplicate copy of this sheet is enclosed.c. ☐ The Commissioner is hereby authorized to charge any additional fees which may be required by 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No. \_\_\_\_\_. A duplicate copy of this sheet is enclosed.

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DECEMBER 26, 2001

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10/018883  
PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Jean-Francois DION et al.

CONFIRMATION NO. 8720

Serial No. 10/018,883

Filed December 26, 2001

SUPPLY DEVICE FOR SNOW GUN

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to issuance of an action on the merits, please  
amend the above-identified application as follows:

IN THE CLAIMS:

Amend claim 3 as follows:

3. (amended) - A Supply device for a snow gun according  
to claim 1, characterised in that the slide valve (14) comprises  
a bleed channel (59) consisting of an axial bore located at its  
lower section, leading via a conduit (61) into the duct (10) of  
the outlet port (9) to perform the bleeding, which channel (59)  
is open or closed according to the position of the said slide  
valve by means of a plug (62) extending axially from the lower  
end of the body.

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Amend claim 5 as follows:

5. (amended) - A Supply device for a snow gun according to claim 1, characterised in that the cylindrical bore (12) of the body (1) between the intake channel (4) and the duct (10) of the outlet port (9), comprises a zone (54) provided in the form of a mixer enabling, in co-operation with the cylindrical section (43) forming the plug of the slide valve, to vary the through opening of the fluid as the slide valve moves between a completely open position and its closed position.

Amend claim 6 as follows:

6. (amended) - A Supply device for a snow gun according to claim 1, characterised in that the control means of the slide valve (14) consist of a reduction gear (65) located in a cap (2) that is attached to the top of the body (1), in a tight fashion, which cap also contains a mechanism plate (72) on which are gathered in the form of an integrated circuit the various control systems of the said reduction gear, the circuits associated with the limit switches (71) triggered by a finger (69) attached to the upper end of the said slide valve (14), the control circuit of the resistor (75) serving to re-heat the body to prevent frost problems and, possibly, the water pressure measuring circuits in the intake channel (5) and in the outlet channel (10), whereas the body is fitted with a connector (77) or a tight grommet orifice.

Amend claim 7 as follows:

7. (amended) - A Supply device for a snow gun according to claim 1, characterised in that the intake and/or through orifices (4) of the channel (5) comprise a double cylindrical bore (20, 21), one of which provides the necessary tightness, and the other, enables to fasten the accessories associated with the body (1), which fastening means consist of a keying system (30) in the form of needles, which needles are diametrically opposite in holes (29) opening into the external bore (21) and enable the said needles to co-operate with a groove (26) provided on the corresponding cylindrical section (25) of the said accessory.

Amend claim 9 as follows:

9. (amended) - A Supply device for a snow gun according to claim 7, characterised in that the accesory which can be associated to the body (1) has either the shape of a plug (37) or of a tubular socket (22), which enables to associate and to juxtapose two bodies (1), either in the form of a plug socket (39) that enables to associate to the body (1) while separating the fluids of each body, or a T-shaped connection piece (36) or a socket (34) or an elbow (40) still.

REMARKS

Attached hereto is a marked-up version of the changes made to the claims. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

YOUNG & THOMPSON

By *Benoit Castel*  
*[Signature]*

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claim 3 has been amended as follows:

3. (amended) - A Supply device for a snow gun according to [any of the claims 1 or 2] claim 1, characterised in that the slide valve (14) comprises a bleed channel (59) consisting of an axial bore located at its lower section, leading via a conduit (61) into the duct (10) of the outlet port (9) to perform the bleeding, which channel (59) is open or closed according to the position of the said slide valve by means of a plug (62) extending axially from the lower end of the body.

Claim 5 has been amended as follows:

5. (amended) - A Supply device for a snow gun according to [any of the claims 1 to 4] claim 1, characterised in that the cylindrical bore (12) of the body (1) between the intake channel (4) and the duct (10) of the outlet port (9), comprises a zone (54) provided in the form of a mixer enabling, in co-operation with the cylindrical section (43) forming the plug of the slide valve, to vary the through opening of the fluid as the slide valve moves between a completely open position and its closed position.

Claim 6 has been amended as follows:

6. (amended) - A Supply device for a snow gun according to [any of the claims 1 to 5] claim 1, characterised in that the control means of the slide valve (14) consist of a reduction gear (65) located in a cap (2) that is attached to the top of the body (1), in a tight fashion, which cap also contains a mechanism plate (72) on which are gathered in the form of an integrated circuit the various control systems of the said reduction gear, the circuits associated with the limit switches (71) triggered by a finger (69) attached to the upper end of the said slide valve (14), the control circuit of the resistor (75) serving to re-heat the body to prevent frost problems and, possibly, the water pressure measuring circuits in the intake channel (5) and in the outlet channel (10), whereas the body is fitted with a connector (77) or a tight grommet orifice.

Claim 7 has been amended as follows:

7. (amended) - A Supply device for a snow gun according to [any of the claims 1 to 6] claim 1, characterised in that the intake and/or through orifices (4) of the channel (5) comprise a double cylindrical bore (20, 21), one of which provides the necessary tightness, and the other, enables to fasten the accessories associated with the body (1), which fastening means consist of a keying system (30) in the form of needles, which needles are diametrically opposite in holes (29) opening into the



external bore (21) and enable the said needles to co-operate with a groove (26) provided on the corresponding cylindrical section (25) of the said accessory.

Claim 9 has been amended as follows:

9. (amended) - A Supply device for a snow gun according to [any of the claims 7 or 8] claim 7, characterised in that the accessory which can be associated to the body (1) has either the shape of a plug (37) or of a tubular socket (22), which enables to associate and to juxtapose two bodies (1), either in the form of a plug socket (39) that enables to associate to the body (1) while separating the fluids of each body, or a T-shaped connection piece (36) or a socket (34) or an elbow (40) still.

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## A SUPPLY DEVICE FOR A SNOW GUN

This invention relates to a supply device for a snow gun.

This equipment is used under very particular and very severe conditions,  
5 notably from a climatic viewpoint.

An example of equipment is described in the document FR-2 573 854.  
This document gives the detail of a snow-making plant and in particular a  
supply device for a high pressure-type snow gun.

To take maximum advantage of the climatic conditions, it is conventional  
10 to use several high pressure-type snow guns, each having different, but  
complementary characteristics in terms of flow rate.

In such a case, each snow gun comprises its own supply device, of the  
type described in the document mentioned above.

This type of supply device is not adequate for snow guns or spray  
15 devices any longer, of the type described in the document FR-2 784 905 which  
require several distinct pressurised water supplies or for any other types of  
snow gun that operate without resorting to any special pressurised water supply  
system.

This invention suggests a supply device that enables to meet the new  
20 requirements of snow guns.

This supply device comprises at least a valve for circulating either  
pressurised water or pressurised air, which valve contains, in a single piece  
body, for example:

- a through channel forming the fluid intake and also serving as a through  
25 passage for the said fluid,
- a fluid outlet port, situated above the said channel,
- a bleed orifice beneath the said channel,
- a cylindrical bore arranged according to an axis perpendicular to that of the  
said channel, to accommodate a slide valve that is mobile under the effect of a  
30 driving member, which slide valve is provided to, in one case, put the channel in  
communication with the said outlet port, and to, in another case, put the said

outlet port in communication with the said bleed orifice in order to bleed the fluid outlet system.

Still according to the invention, the supply device comprises at least one valve and in particular a valve whose body is arranged, at the level of both ends  
5 of the through channel, in an identical fashion, for accommodating and fixing either various accessories such as connectors, plugs or others, or other valve bodies.

— This arrangement of the valve body thus enables to juxtapose, as required, several bodies forming a kind of compact cluster that is easier to  
10 install than a multitude of valves in shelters or others, on the border of skiing tracks for example.

According to another arrangement of the invention, the slide valve comprises a bleed channel consisting of an axial bore located at its lower section, which channel leads, via a conduit situated on the radial plane of the  
15 said slide valve, into the outlet port to perform the said bleeding, which channel is open or closed according to the position of the said slide valve by means of a plug extending axially from the lower end of the body, and that co-operates with the said bleed channel.

According to another arrangement of the invention, the slide valve is  
20 guided at its lower end into a socket forming a kind of jacket integral with the valve body, which socket comprises a punched bottom to enable the fluid to flow during the said bleeding, which bottom supports the closing plug of the bleed channel of the said slide valve.

Still according to the invention, the cylindrical bore of the body  
25 comprises, between the intake channel and the outlet conduit, a zone provided in the form of a mixer enabling, in co-operation with the section forming the plug of the slide valve, to vary the through opening of the fluid as the slide valve moves from a completely open position with maximum flow rate to a closed position, which stops the circulation of the fluid through the said body.

30 The valve also has a compact shape forming a true module that can be replaced easily in case of any incident. Thus, according to the invention, the control means of the slide valve consist of a reduction gear located in a cap,

itself attached to the top of the body, which cap also contains the control system of the said reduction gear, the limit switches of the said slide valve, the heating control system of the body and, possibly, the water pressure measuring means in the intake channel and in the outlet channel, whereas the systems are  
5 gathered on a wafer in the form of an integrated circuit, which wafer also comprises the limit switch system placed opposite to a control finger integral with the said slide valve, and the body comprises a connector and a tight grommet orifice.

According to another arrangement of the invention, the intake and/or  
10 through orifices comprise a double cylindrical bore, one of which, situated inwardly, provides the necessary tightness with the associated part or element, and the other, situated at the intake, enables to fasten the latter by means of a transversal keying system, which system comprises keys such as needles, that are diametrically opposite, guided through orifices of the body opening into the  
15 intake bore, which needles co-operate with a circular groove provided in the accessory part and in particular on the periphery of a cylindrical section inserted into the intake bore of the valve body.

Still according to the invention, the keys are connected together, forming a kind of U that is fixed to the body by any appropriate means and preferably by  
20 a screw serving simultaneously as a blocking member of the accessory part in relation to the valve body.

Still according to the invention, the accessories liable to be associated with the valve body may consist of a junction and assembly socket of two bodies ensuring communication of the supply channel of each of them, or even  
25 consist of a plug socket blanking off one of the orifices of the supply channel or still separating two bodies, whereas one of them can be used for water supply while the other is used for air supply of the spray device.

Still according to the invention, the accessories may also consist of connectors for the water and air supply pipes, which connectors would simply  
30 be in the form of sockets, T, elbows, etc.

The invention shall be detailed further using the following description and appended drawings, given for exemplification purposes and on which:

- figure 1 is a schematic perspective view of a valve of the supply device according to the invention;
- figure 2 is a sectional view along a vertical plane through the axis of the supply channel, the valve body and the plug placed in the said body;
- 5 - figure 3 is a sectional view along a vertical plane through the outlet channel, the valve assembly with the plug, half in completely open position and half in a completely closed position, enabling to bleed the said outlet channel;
- figure 4 shows the grouping of the valves together;
- figure 5 is a partial view of a valve body assembly with an accessory;
- 10 - figure 6 shows the locking means of an accessory on the valve body and the valve body fitted with means for locking a sleeve on the outlet orifice;
- figure 7 shows the various possibilities to vary the angular position of the valve bodies in relation to one another.

The valve represented schematically on figure 1 comprises a valve 1  
 15 topped with a cap 2. The body 1 is for instance made of a single moulded piece, of light alloy such as aluminium. The cap is made of plastic material, for example, and contains as detailed further, the control gears and the electrical circuits. This cap 2 is assembled and fixed in a tight fashion to the top of the body 1.

20 The body 1 comprises several orifices and channels. There are, at its lower section, centred on the axis 3, orifices 4 situated on either side of the body at the ends of a channel 5 centred on the axis 3, which channel 5 forms the supply or intake channel.

The orifices 4 are therefore intake, but also through orifices, i.e. enabling  
 25 to supply a valve body juxtaposed as detailed below.

This intake channel 5 is situated in kind of block 6 in form of a parallelepiped making up the lower section of the body 1. This block 6 is topped with another block 7 oriented perpendicularly, which comprises the outlet orifice 9 and contains an outlet port 10 as shown on figure 3.

30 Through both these blocks 6 and 7 go a transversal bore 12 centred on an axis 13 perpendicular to the axis 3 of the channel 5 of the block 6. This

cylindrical bore 12 illustrated on figures 2 and 3, enables to accommodate the slide valve 14 that will be detailed below.

This cylindrical bore 12 extends above the block 7 in a cylindrical section 15 that is accommodated inside the cap 2.

5 The lower section of the block 6 comprises an orifice 16 that corresponds to the bleed orifice. This orifice 16 is situated in the extension of the bore 12, at its lower section.

10 It can be noted that the outlet orifice 9 situated in the block 7, is centred on an axis 19 describing an angle in the order of  $45^\circ$  with respect to the axis 13, oriented towards the top of the valve. This axis 19 and the outlet duct 19, are centred on a plane perpendicular to the axis 3, going through the axis 13 of the bore 12.

15 Figure 1 represents the compactness of the valve and its capacity to form a kind of module that enables as shown on figure 4, to create a supply device for a snow gun while gathering several valves V1, V2, V3, V4 in order to form, from a single and unique general water and air supply system, a water and air distribution plant wherein pressures and flow rates can be selected to suit the requirements.

20 Juxtaposition of the valve bodies is enabled by means of an arrangement of the orifices 4 situated on either side of the block 6 of the valve. These orifices 4 comprise an internal bore 20 at the end of the channel 5 and an external bore 21 close to the end face of the block 6. This arrangement of the orifice 4 enables to accommodate various accessories such as for example a socket 22 as represented partially on figure 5. This socket 22, of tubular shape, comprises  
25 at one of its ends a cylindrical portion 23 fitted with an O-ring 24 that co-operates with the internal bore 20 provided at the level of the orifice 4. This cylindrical portion 23 is followed by a second cylindrical portion 25 fitted with a groove 26. This second cylindrical portion 25 co-operates with the external bore 21 of the orifice 4.

30 This bore 21 comprises holes 29, diametrically opposite and parallel to one another, centred on a plane perpendicular to the axis 3. These holes enable the passage of keys 30 that are in the form of needles. The orifices 29

open into the bore 21, enabling to position the needles 30 in the groove 26 provided at the level of the cylinder 25 of the accessory 22, thereby locking this accessory in the orifice 4.

As represented on figure 6, the needles 30 are connected together by a small bar 31 that enables to immobilise them in active position by means – of a screw 32 engaging into the body 1, in an appropriate thread and – of a nut 33 clamping the assembly together. The screw 32 may also enable to lock the position of the accessory 22 in order to prevent it from turning inside the orifice 4, round the axis 3.

Still on figure 6, the needles 30 are represented facing the holes 29 provided on either side of the orifice 4 in the block 6.

This arrangement of the orifices 6 can be found similarly at the level of the outlet port 9 of the body 1. So, the same needles 30 appear in normal position for locking an accessory 34 consisting of a male connector placed at the level of the outlet port 9 of the body.

Figure 7 shows lateral views of a valve V represented in full lines and a second valve V' coupled to the former, represented in mixed thin lines and tilted with respect to the form by angle of  $30^\circ$ . This possibility to vary the angle of the outlet axes 19 of each valve simplifies the connections of the said valves with the supply pipes of the snow gun(s).

This possibility of angular variation is however limited by the necessity to keep a gravitational flow in order to bleed the outlet system.

Figure 4 shows several kinds of accessories that enable to group valves V1, V2, V3, V4 to form a supply device.

Thus, there is a T-shaped accessory 36 situated in the middle of both groups of valves. This accessory 36 enables to feed the different valves and in particular the valves V1, V2 situated on its right on the figure and the valve V3 on its left.

The bodies of the pair of valves V1, V2 are interconnected by means of an accessory 22 in the form of a single socket as illustrated on figure 5. At the end, on the valve V2, an accessory 37 in the form of a plug blanking off the orifice 4 of the body 1 can be seen. The valve V2 is supplied via the valve V1.

The valve V1 is fixed to the T 36 using a socket 22 identical to that provided between the valves V1 and V2.

The valve V3 situated on the left of the T 36 on the figure is also fixed to that T 36 by means of a socket 22. The valve V3 is supplied with water also  
5 through the T 36.

The valve V4 grouped with the other valves, is used to control the passage of the compressed air.

This valve V4 is fixed to the valve V3 by means of a plug socket 39 that enables to plug one of the orifices 4 of the valve V3 of the valve V4  
10 simultaneously.

This valve V4 is supplied on its left by means of an accessory 40 in form of an elbow, for example.

Figures 2 and 3 show, in a more detailed fashion, the internal essential elements of the valve. The slide valve 14 comprises a cylindrical section 41  
15 guided in the upper section of the body 1 in a hole 42 of the cylindrical bore 12. The lower section of the slide valve 14 has the shape of cylindrical valve 43 connected to the cylindrical section 41 by a rod 44 whose diameter is approx. half that of the said cylindrical sections.

Both cylindrical sections 41 and 43 have the same diameter.

20 The cylindrical section 43 serves as a valve and it is guided in a socket or jacket 45 that positions itself at the level of the bleed orifice 16. This jacket 45 comprises a cylindrical section 46 engaging into the block 6 and even into the channel 5 with a shape enabling water to flow into the said channel 5. A collar 47 enables to attach that jacket 45 to the lower section of the block 6 and the  
25 bottom 49 of the said jacket comprises orifices 50 that enable the evacuation of water during the bleeding.

The bleeding will be detailed further in connection with figure 3.

The section forming a valve 43 moves inside the body 1 and in particular in the bore 53 situated between the supply channel 5 and the outlet duct 10.  
30 The intake 54 of that bore 53 is shaped as a mixer in order to adjust the flow rate between the channel 5 and the outlet port 10. This flow rate is adjusted by moving the slide valve 14 between the open position as represented on figure 2



and a closed position in which the upper joint 55 of the valve 43 isolates the supply channel 5 with respect to the outlet port 10.

Figure 3 shows two halves of the slide valve 14; the right-hand half of the figure is a normal open position as for figure 2 while the left-hand half on figure 3 is in normal position for blanking off the passage between the intake channel 5 and the outlet port 10.

It can be noted that the valve 43 comprises an internal channel 59 that enables to bleed the outlet system. This channel 59 comprises a bore of the central portion of the valve 43 and an oblique duct 61 that connects the said bore to the outlet port 10. It can be seen that in this closing position of the slide valve, water may flow through the bleed channel 59, and away through the orifices 50 provided in the bottom 49 of the jacket 45.

The bottom 49 comprises a plug 62 extending axially in the bleed channel 59. This plug 62, fitted with an O-ring 63 at its end, blanks off the bleed channel 59 when the valve 43 is open in a position that enables water or air to flow between the intake channel 5 and the outlet duct 10. Conversely, in normal closing position of the valve, the plug 62 opens the channel 59 and thus enables automatic bleeding of the outlet system.

The slide valve 14 moves under the effect of a control member consisting of a reduction gear 65. This reduction gear 65 is integral with the body 1 and it is in particular flanged to the upper end of the cylinder 15 that extends the said body inside the cap 2. The slide valve 14 comprises an internal bore 66 that is threaded and co-operates with the screw 67 driven by the reduction gear 65.

The slide valve 14 comprises at its upper end, a finger 69 that is guided vertically in a light 70 of the cylinder 15. This finger 69 also enables to trigger limit switches 71. These limit switches are arranged on a wafer 72 provided in the form of an integrated circuit on which are gathered the various components that enable to operate the valve and also to collect the parameters linked to the operation of this valve.

Thus, the valve contains pressure transducers 73 and 74. These pressure transducers are in communication with, on the one hand, the supply channel 5 and on the other hand, the outlet port 10.

The body 1 is also fitted with a heating resistor 75 whose operation is controlled from the mechanism plate 72.

The body 1 comprises an orifice 76 enabling the passage of supply and/or control wires connected to the mechanism plate 72. A connector 77 or a  
5 grommet enables to connect the valve to a general control panel that supervises the operation of the snow gun(s).

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- CLAIMS -

1.- A Supply device for a snow gun comprising at least one valve for circulating either pressurised water or pressurised air, which valve contains, in a single piece body (1):

- 5 - a through channel (5) forming the fluid intake and also serving as a through passage for the said fluid,
- a fluid outlet port (9), situated above the said channel (5),
- a bleed orifice (16) beneath the said channel (5),
- a cylindrical bore (12) arranged according to an axis perpendicular to the axis
- 10 (3) of the said channel (5), in which a slide valve (14) is accommodated, which is mobile under the effect of a control member (65), which slide valve is provided to, in one case, put the said channel (5) in communication with the said outlet port (9), and to, in another case, put the said outlet port (9) in communication with the said bleed orifice (16) in order to bleed the fluid outlet
- 15 system.

2.- A Supply device for a snow gun according to claim 1, characterised in that it comprises at least one valve whose body (1) is arranged at the level of both ends of the channel (5), in an identical fashion, for accommodating and fixing either various accessories such as connectors, plugs or others, or other

20 valve bodies.

3.- A Supply device for a snow gun according to any of the claims 1 or 2, characterised in that the slide valve (14) comprises a bleed channel (59) consisting of an axial bore located at its lower section, leading via a conduit (61) into the duct (10) of the outlet port (9) to perform the bleeding, which channel

25 (59) is open or closed according to the position of the said slide valve by means of a plug (62) extending axially from the lower end of the body.

4.- A Supply device for a snow gun according to claim 3, characterised in that the slide valve (14) is guided at its lower end into a jacket (45) integral with the valve body (1), which jacket comprises a punched bottom (49) to enable the

30 fluid to flow during the said bleeding, which bottom supports the plug (62) which closes the bleed channel (59) when the slide valve is in inactive blanking off position.

5.- A Supply device for a snow gun according to any of the claims 1 to 4, characterised in that the cylindrical bore (12) of the body (1) between the intake channel (4) and the duct (10) of the outlet port (9), comprises a zone (54) provided in the form of a mixer enabling, in co-operation with the cylindrical section (43) forming the plug of the slide valve, to vary the through opening of the fluid as the slide valve moves between a completely open position and its closed position.

6.- A Supply device for a snow gun according to any of the claims 1 to 5, characterised in that the control means of the slide valve (14) consist of a reduction gear (65) located in a cap (2) that is attached to the top of the body (1), in a tight fashion, which cap also contains a mechanism plate (72) on which are gathered in the form of an integrated circuit the various control systems of the said reduction gear, the circuits associated with the limit switches (71) triggered by a finger (69) attached to the upper end of the said slide valve (14), the control circuit of the resistor (75) serving to re-heat the body to prevent frost problems and, possibly, the water pressure measuring circuits in the intake channel (5) and in the outlet channel (10), whereas the body is fitted with a connector (77) or a tight grommet orifice.

7.- A Supply device for a snow gun according to any of the claims 1 to 6, characterised in that the intake and/or through orifices (4) of the channel (5) comprise a double cylindrical bore (20, 21), one of which provides the necessary tightness, and the other, enables to fasten the accessories associated with the body (1), which fastening means consist of a keying system (30) in the form of needles, which needles are diametrically opposite in holes (29) opening into the external bore (21) and enable the said needles to co-operate with a groove (26) provided on the corresponding cylindrical section (25) of the said accessory.

8.- A Supply device for a snow gun according to claim 7, characterised in that the keys (30) are interconnected together, forming a kind of U that can be fixed to the body by any appropriate means, in particular a screw (32) serving simultaneously as a blocking member of the accessory by clamping the said using the said keys.

9.- A Supply device for a snow gun according to any of the claims 7 or 8, characterised in that the accessory which can be associated to the body (1) has either the shape of a plug (37) or of a tubular socket (22), which enables to associate and to juxtapose two bodies (1), either in the form of a plug socket  
5 (39) that enables to associate to the body (1) while separating the fluids of each body, or a T-shaped connection piece (36) or a socket (34) or an elbow (40) still.

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## ABSTRACT OF THE DISCLOSURE

The invention concerns a device consisting of at least a valve comprising a body (1) with a through channel (5), provided with several orifices and in particular orifices (4) serving both as intake and/or through passage, which orifices (4) are provided to enable, by means of accessory components, two bodies to be juxtaposed, and provide a common supply to several valves. The communication between the intake channel (5) and the outlet port (9) is provided by means of a cylindrical bore and a slide valve mobile in said bore. The outlet port (9) is located above the channel (5) and a bleed orifice (16) is located beneath said channel. Said bleed orifice (16) is in communication with the outlet port by means of the slide valve.

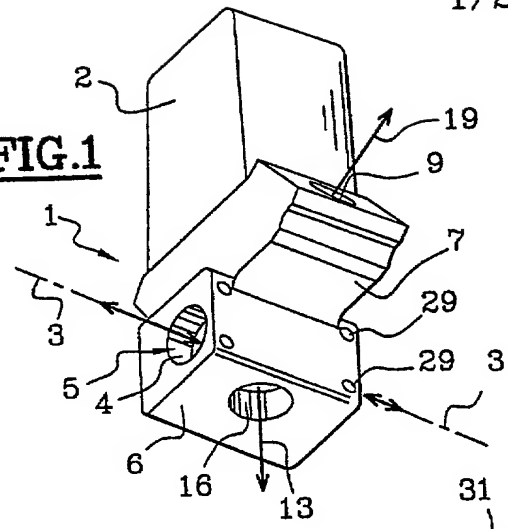
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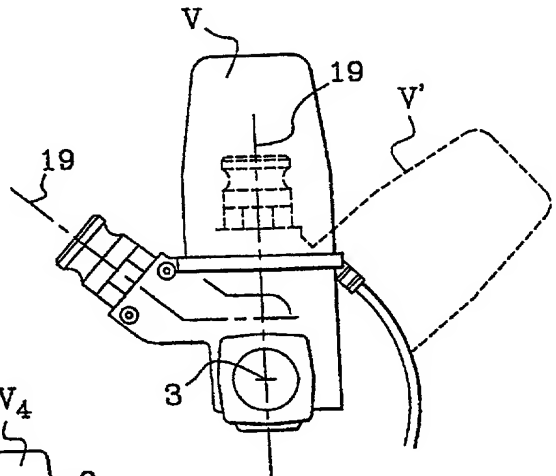
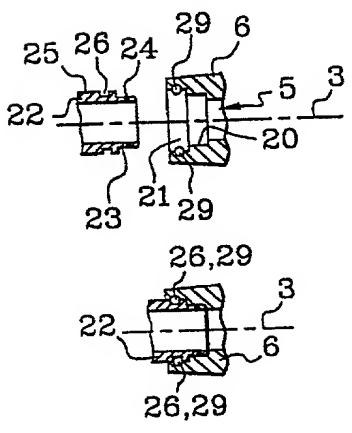
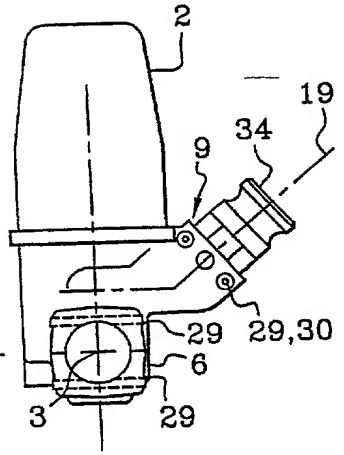
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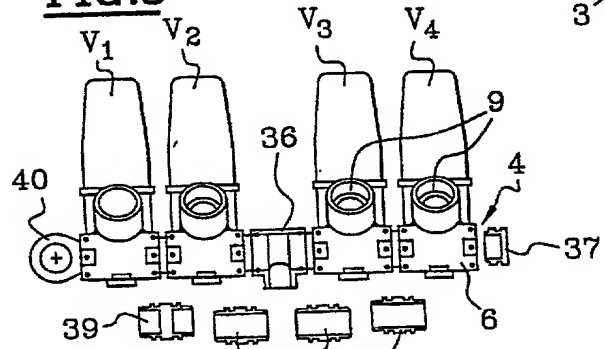
**FIG.1**



**FIG.6**



**FIG.5**

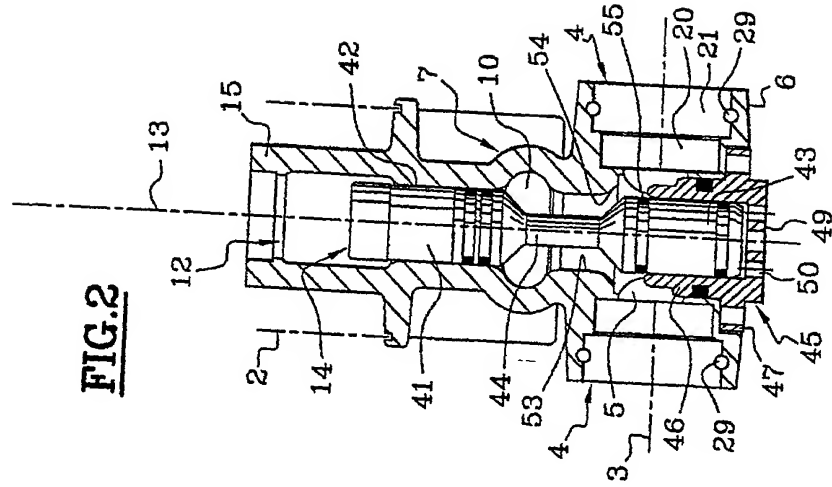


**FIG.4**

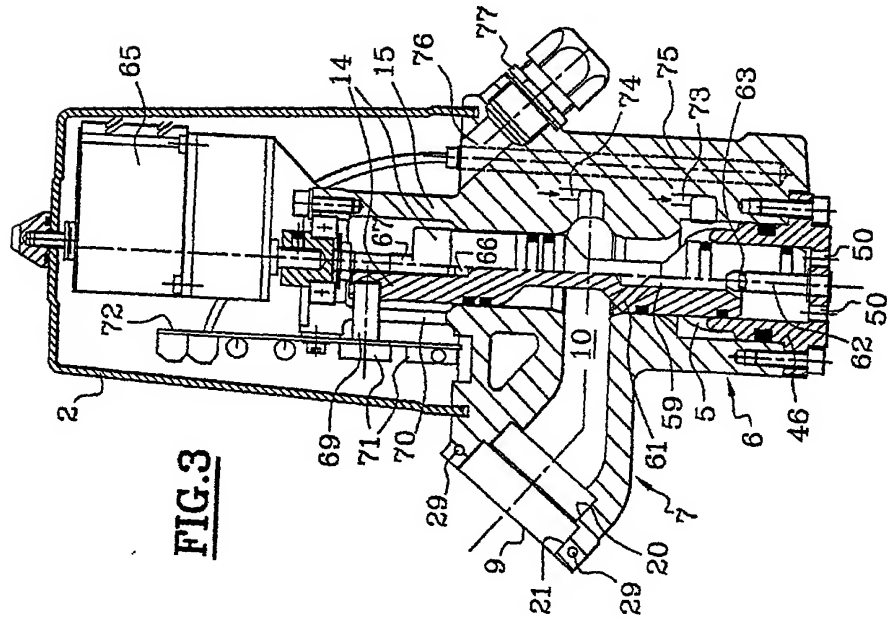
**FIG.7**

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**FIG.2**



**FIG.3**



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**COMBINED DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**SUPPLY DEVICE FOR SNOW GUN**

the specification of which: *(check one)*

**REGULAR OR DESIGN APPLICATION**

☐ is attached hereto.

☒ was filed on 26 December 2001 as application Serial No. \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

**PCT FILED APPLICATION ENTERING NATIONAL STAGE**

☒ was described and claimed in International application No. **PCT/FR00/01772** filed on **23 June 2000** and as amended on \_\_\_\_\_ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

**PRIORITY CLAIM**

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

**PRIOR FOREIGN APPLICATION(S)**

Country	Application Number	Date of Filing (day, month, year)	Priority Claimed
FRANCE	99/08438	25 JUNE 1999	YES

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below:

Provisional Appln. \_\_\_\_\_  
(Application Serial No.) (Filing Date) (Status--patented, pending, abandoned)

*(Complete this part only if this is a continuing application.)*

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Appln. \_\_\_\_\_  
(Application Serial No.) (Filing Date) (Status--patented, pending, abandoned)

## POWER OF ATTORNEY

- The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from Cabinet Harlé et Phélip as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered patent attorneys represented by Customer No. 000466 to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, including: Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Eric JENSEN, Reg. No. 37,855, Thomas W. PERKINS, Reg. No. 33,027, and Roland E. LONG, Jr., Reg. No. 41,949,

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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